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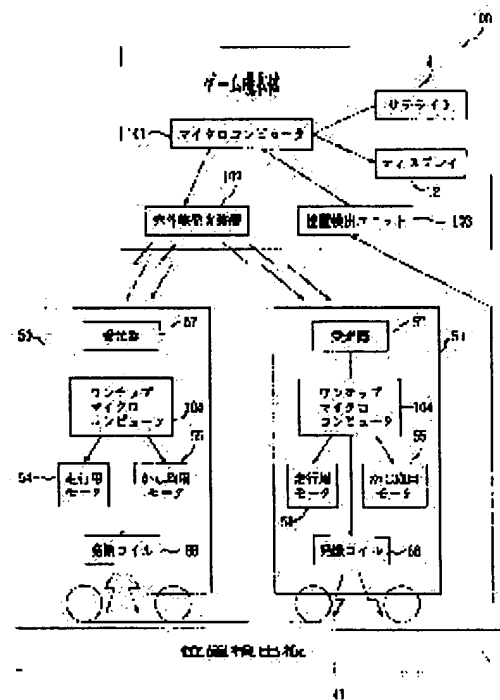
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(54) GAME MACHINE

(57)Abstract:

PROBLEM TO BE SOLVED: To enable to run several running bodies independently in the field so that they moves regardless of the course to obtain an approximately actual race condition.

SOLUTION: This game machine is composed of a model running surface on which models run, a lower running surface which is disposed under the model running surface, a plurality of running bodies 50 set on the lower running surface so as to guide corresponding model bodies running connected with running bodies by magnetic force through the model running face, and the model running surface and the lower running surface are constructed so that the model bodies and running bodies 50 are able to run independently regardless of the course. Each running body 50 has its own drive control mechanism 104 so that it can run independently, the running control means 101 sends running control signals to each running body and controls a race in which several running bodies 50 compete with others, and the running bodies 50 control the drive control mechanism 104 independently according to a received running control signal to run on the lower running surface.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the game equipment imitating the race which competes a truck top, such as a horse race and a car race.

[0002]

[Description of the Prior Art] There are many competition game equipments imitating the horse race, the car race, etc. conventionally. For example, although there were some which two or more models which can rotate freely at the nose of cam of an arm in which it circles in the early example which is made to run an automobile model on an annular truck, and competes for arrival ranking are attached [some] in the shape of the said heart, and rotate the aforementioned whirling arm and two or more aforementioned models, respectively With the equipment of this form, since regularity was in movement of an automobile model, there was a fault by which interest is spoiled.

[0003] Then, movement of each automobile model is made irregular and the example (JP,52-38781,B) it was made for anticipation of ranking not to attach is proposed. Along with fixed circulation tracing set up by the guidance means, a circulation means moves this example, two or more move models are prepared in this circulation means free [reciprocation], and each move model is made to carry out a both-way drive separately.

[0004] Therefore, it is possible in the race expansion which is made to reciprocate a circulation means top further while each move model (an example automobile model) moves with the circulation means which carries out circulation movement along with circulation tracing, does not give regularity since competition ranking is determined by the movement of the driving means which drive each move model separately, and anticipation of a play person does not attach.

[0005]

[Problem(s) to be Solved] However, since each move model carries out reciprocation fixed on a circulation means, circulation tracing is always fixed. That is, the move model located in the course of the outside of a circuit will always turn around an outside course, and the move model located in an inside course will always move an inside course.

[0006] Although one automobile is arranged by each course of each from the inside to an outside at the time of a start, if in the case of an actual car race etc. a race starts and an automobile puts in a curve, it is going to run a curtate distance as much as possible, and each automobile will move to an inside course.

[0007] Therefore, since each automobile tends to run an inside curtate distance as much as possible rather than tends to run the decided course, each automatic person

concentrates and it comes to be located in a line with an abbreviation single tier. In the actual race, since a race develops as mentioned above, full use of the technique of the diplomacy and others on competition shall be made, and it shall be [that what is necessary is not just not to gather speed simply] more interested in the race.

[0008] However, like the aforementioned conventional example, by what moves an always fixed course, it becomes an actual race like the above from a start to gall with what was widely different, and presence cannot but fade and each move model cannot but become with what also reduced interest by half.

[0009] this invention was made in view of this point, two or more run objects drive the inside of the field independently, and the place made into the purpose is in the point of offering the competition game equipment which moved regardless of the course and made possible the movement same [actual] as race expansion and abbreviation.

[0010]

[Means for Solving the Problem and its Function and Effect] In order to attain the above-mentioned purpose, this invention casts its vote by a play person expecting a winning-prize model object. The model object run side is game equipment which performs the race in which the model object of the plurality after a vote end competes for it and runs turn, and pays a dividend to a play person according to a race result and vote, and a model object runs, The lower part run side arranged down the model object run side, and two or more run objects arranged on a lower part run side so that a run of the model object which joins together by magnetism and corresponds through a model object run side may be guided, It has the run control means which control a run of a run object. the aforementioned model object run side and a lower part run side It is constituted possible [a run], without a model object and a run object having a run course regulated. The aforementioned run object is carried in each and it has individually the drive controlling mechanism in which run control is possible. The aforementioned run control means control the race expansion which transmits a run control signal to each of a run object, and is performed with two or more aforementioned run objects. By running a lower part run side, without controlling a drive controlling mechanism individually according to the received run control signal, and regulating a run course, each of the aforementioned run object It considered as the game equipment constituted so that race expansion it runs, without the aforementioned model object being regulated by the run course might be realized.

[0011] The run object which runs a lower part run side makes the model object which runs a model object run side follow in footsteps through magnetism. And the run object which runs with a drive controlling mechanism can run without the model object which follows in footsteps of this run object also having a run course regulated, since run control is carried out without regulating a run course according to the run control signal from run control means, and can develop a race.

[0012] Therefore, like an actual race, each model object does not have a run course regulated, but as the most advantageous possible position is secured, it runs the position, the actually based race expansion is made, and the exciting game which exists a feeling of presence can be enjoyed.

[0013]

[Embodiments of the Invention] The form of 1 operation of the invention in this application is explained based on drawing 1 or drawing 24 below. The form of this

operation is an outline block diagram which surveys the run control system of a run object which makes it run a model horse [in / this horse race game equipment 1 / about a horse race game / in drawing 1].

[0014] For advance of a game, the computer is controlling and the run control means B are two or more run objects A1 and A2, --, An. Run control is performed. C is a control signal transmitting means to transmit the control signal of these run control means B. D1, D2, --, Dn Each run objects A1 and A2, --, An It is a control signal receiving means to receive the control signal which was carried and was transmitted by the aforementioned control signal means C.

[0015] E1, E2, --, En Each run objects A1 and A2, --, An It is carried and they are the aforementioned control signal receiving meanses D1 and D2, --, Dn. It is based on the received control signal and they are the run objects A1 and A2, --, An. They are the driving means it is made to run. F1, F2, --, Fn Each run objects A1 and A2, --, An It is carried and they are these run objects A1 and A2, --, An. It is a position detecting-signal transmitting means to transmit the signal which detects the position on a truck.

[0016] G is each run objects A1 and A2, --, An. The aforementioned position detecting-signal transmitting meanses F1 and F2, --, Fn It is a position detecting-signal receiving means to receive the transmitted position detecting signal and to feed back to the aforementioned run control means B. Race expansion is determined as the bottom of control of a computer at random for every race, and they are the run objects A1 and A2, --, An. Anticipation does not attach ranking, either. And the run objects A1 and A2 and -- it runs independently mutually, and An A control signal can be received and it can move regardless of a course in a truck top according to this control signal.

[0017] Moreover, each run objects A1 and A2, --, An A position is fed back to the run control means B, and since run control is carried out, the race expansion for which it opted by computer is certainly realizable. Therefore, without being regulated by the course like an actual race, the actually based race expansion shall be possible, and lessons shall not be taken for anticipation of arrival ranking from a play person, but interest shall be excited more.

[0018] This whole horse race game equipment 1 external view is illustrated to drawing 2 . The annular truck 3 is stretched by the upper surface of the oblong pedestal 2, and the satellite 4 in every 4 seats is arranged respectively in the stand position by the side of this side and the back.

[0019] While each satellite 4 is equipped with a monitor 5, the control panel 6, the coin slot 7, and the coin expenditure mouth 8 are attached to it, coin can be thrown in, and its vote can be cast for the winning-a-prize horse which operates this control panel 6 and is expected by the simplex or double.

[0020] From the stand position by the side of one curve of a truck 3, the arm material 9 which carried out the gryposis towards the upper part position of the center of a truck 3 is prolonged, and fixed support of the lighting system 11 is carried out so that a loudspeaker 10 and the downward truck 3 may be illuminated at the nose of cam.

[0021] It is a switching circuit 162 in every time t of this. When it is made to switch a switch, it is an electric wire x0 and x1. When energized by --, it is the X counter 163. It operates and is an electric wire y0 and y1. When -- is energized, it is the Y counter 164. It can operate and the move position of a carrier can be detected by time sharing.

[0022] The display 12 is formed in the mid-position of this arm material 9 towards the

truck 3 side, and it indicates whether to be introduction of a horse, a number, a framework, and bet ****. It can run now the model horse 20 which carried the rider 21 of six animals on the truck 3.

[0023] The drive of the model horse 20 is explained based on drawing 3 below. The model horse 20 (a rider 21 omits) is supported by the truck 23 through the support 22, a front wheel 24 is formed in one piece, the rear wheel 25 is formed in two right and left at the truck 23, and a front wheel 24 is supported by the supporter material 26 supported pivotably by the truck 23 free [rotation] by making the perpendicular direction into pivotable support shaft orientations, and can change the run direction now smoothly.

[0024] Between two rear wheels 25, some interval is **(ed) from the front face of a truck 3, and the magnet 27 is being fixed to the truck 23. The model horse 20 rocks forefoot 20a and hind leg 20b forward and backward following rotation of a rear wheel, and imitates the run of an actual horse.

[0025] The truck 3 is carrying out the three-tiered structure, and the electric supply board 32 is laid by the design field 30 which consists of an aluminum board which carried out electrostatic flocking of the front face to the upper layer, and the middle lamella at the back up plate 31 made from an acrylic, and a lower layer. Under the electric supply board 32, it has space, it counters with the upper truck 3 through circumferential space, and the separate run way 40 is laid. As for the run way 40, the carrier 50 with which the acrylic 42 was stretched by the upper surface of the thick position detection board 41, and runs it the aforementioned model horse 20 on this run way 40 is arranged.

[0026] A carrier 50 is the motor 54 for a run which drives a rear wheel 52 on the substrate 53 supported with the front wheel 51 and the rear wheel 52, the motor 55 for steering, the motor drive substrate 56, an electric eye 57, the VCO substrate 58, and CPU. Substrate 59 grade is carried. The compression spring 62 which furthermore intervenes between the Itabe material 60 and 61 of two upper and lower sides on it is minded. The magnet 65 is arranged between the current collection unit 70 and the roller 64 of further next right and left in the roller 63 of the front supported horizontally free [rocking] on the upper part Itabe material 60, the back roller 64, and the center. The current collection unit 70 is projected up and eight current collectors 71 are formed.

[0027] the above board -- the relative position of the current collection unit [as opposed to / while the member arranged on a member 60 is energized up with the compression spring 62, a roller 63 and a roller 64 contact the electric supply board 32 of the inferior surface of tongue of the upper truck 3, and a carrier 50 is inserted between a truck 3 and the run way 40 and enabling it to run smoothly / the electric supply board 32] 70 -- predetermined physical relationship -- ** -- it is made like

[0028] Thus, through a spring 72, the nose of cam touches the electric supply board 32, and the current collector 71 which protruded above the current collection unit 70 maintained in the predetermined interval to the electric supply board 32 can receive supply of power from the lower electric supply board 32 by the suitable contact pressure, respectively.

[0029] If this electric supply mechanism is explained a little, a band-like electrode opens some interval on the inferior surface of tongue at two or more parallel, it is laid, and, as for the electric supply board 32, an anode plate and cathode are formed by turns. In addition, a band electrode directs in the right-angled direction with an electrode at the bottom, it is laid by the upper surface, and the up-and-down electrode is connected

electrically in the predetermined part.

[0030] and eight current collectors 71 of the current collection unit 70 ** a predetermined interval mutually, and arrange it in the vertex position of a right octagon -- having -- **** -- always -- any two or more current collectors 71 -- an anode plate and cathode -- it is in the state where any electrode was contacted, can be stabilized, and supply of power can be received now

[0031] Next, the drive of a carrier 50 is illustrated and explained to drawing 4 . In this drawing, the rear wheel 52 of next right and left is connected with an axle 90, and this axle 90 is supported free [rotation] by the bearing bracket 91 fixed to the substrate 53. the motor 54 for a run is perpendicular -- caudad -- a protrusion -- as for a driving shaft 92 and an axle 90, power is transmitted by engagement of the gear in a gearbox 93 the bottom

[0032] The front right-and-left wheel 51 is supported respectively free [rotation at the end of the L character-like arm 94], and the bending section of an arm 94 is supported pivotably horizontally free [rocking] by the supporter material 95 fixed to the inferior surface of tongue of a substrate 53, and the other ends of the arm 94 on either side are connected by the tie rod 96. rack 96a is formed in the posterior side of the center of a tie rod 96, and the motor 55 for steering is perpendicular -- caudad -- a protrusion -- it has geared with the pinion 98 attached at the nose of cam of a driving shaft 97 the bottom

[0033] Therefore, the rotation drive of the motor 55 for steering is changed into movement of the longitudinal direction of a tie rod 96 through a pinion 98 and rack 96a, further, movement of a tie rod 96 makes an arm 94 rock focusing on the supporter material 95, and can change the angle of a front wheel 51, and steering is made. In addition, two motors which drive a right-and-left wheel may be formed separately, and run and steering may be performed by carrying out drive control of this two motor.

[0034] If the model horse 20 is arranged through a truck 3 above the carrier 50 equipped with the above drives and it is made for the magnet 65 by the side of a carrier 50 and the magnet by the side of the model horse 20 to face, the model horse 20 is followed to movement of a carrier 50 with the magnet between magnets. Carrier 50 the very thing receives a control signal by the electric eye 57, drive control is carried out and the motor 54 for a run and the motor 55 for steering run while it obtains power through the electric supply board 32 and the current collection unit 70. In addition, it is fixed to the inferior surface of tongue of the substrate 53 of a carrier 50 oscillation-coil 66, the position of a carrier 50 was detected and fed back through the position detection board 41, and run control of a carrier 50 is presented.

[0035] Then, the system of a control system is explained based on drawing 5 below.

Drawing 5 is the outline block diagram of this control system. main part 100 of a game machine **** -- microcomputer 101 which selects race expansion and performs the main control of all systems Infrared luminescence equipment 102 which oscillates the control signal of the aforementioned satellite 4, a display 12, and the carrier 50 by infrared radiation while being prepared And position detection unit 103 which performs position detection of a carrier 50 It is set up.

[0036] Microcomputer 101 A satellite 4, a display 12, and infrared luminescence equipment 102 Drive control is carried out and it is the position detection unit 103. A position detecting signal is inputted and feedback control of carrier 50 movement is performed. and each carrier 50 -- respectively -- one-chip microcomputer 104 having --

**** -- main part 100 of a game machine Near infrared luminescence equipment 102 from -- the aforementioned electric eye 57 by the side of a carrier 50 receives an infrared signal, an one-chip microcomputer 104 inputs this control signal, this signal is analyzed, and a drive control signal is outputted to the motor 54 for a run, the motor 55 for steering, and an oscillation coil 66

[0037] The oscillation coil 66 with which each carrier 50 was equipped is the main part 100 of a game machine about the portion which it drove with the above-mentioned control signal, the oscillation of frequency 455KHZ was made, and the aforementioned position detection board 41 received the oscillation of this oscillation coil 66, and received the oscillation of the homotopic detection board 41. The near aforementioned detection unit 103 detects, the position of each carrier 50 is recognized, and it is a microcomputer 101 about the detecting signal. It feeds back.

[0038] this example is realized by the above control systems, among these is infrared luminescence equipment 102. The drive control of each carrier 50 performed by the infrared signal is explained based on drawing 6 or drawing 8 .

[0039] Drawing 6 is the infrared photogenic organ 110 in the space between the upper truck 3 and the downward run way 40. It is a plan illustrating arrangement. It is a mirror 111 and 112, respectively to truck-like the periphery and inner circumference of the run way 40. It is installed in the perpendicular direction and is both the mirrors 111 and 112. The mirror plane has countered mutually.

[0040] Mirror 111 of a periphery They are eight infrared photogenic organs 110 to predetermined height. A predetermined interval is opened, and it is attached and is each infrared photogenic organ 110. Mirror 112 It turns and infrared radiation is sent with the width of face of an angle theta. Each infrared photogenic organ 110 The infrared radiation by which the shell oscillation was carried out advances with the breadth of an angle theta, and is a mirror 112. It can all cover without the place which reflects, is spread further and leaves the run way 40.

[0041] Thus, a mirror 111 and 112 Infrared photogenic organ 110 few by using A game use side is uniformly worn by infrared radiation, and an infrared signal is receivable wherever a carrier 50 may be in [of the run way 40]. Furthermore, it is a mirror 111 and 112. Since reflective infrared light results [from all directions] in a carrier 50, it becomes the shadow of other carriers and there is also no fault that an infrared signal is unreceivable.

[0042] Moreover, since infrared radiation is sealed, outside it does not leak, and as for run way 40 headroom, it does not have the influence by the light from outside. This infrared signal is a microcomputer 101. It is whether it is a weir based on the digital signal of a shell, and it is the plug photogenic organ 110. It forms and they are 38KHZ(s) strong against a noise about this digital signal. It carries and sends to a subcarrier. This infrared radiation is the serial control signal by which time sharing was carried out, and the frame corresponding to each carrier is sent serially continuously.

[0043] The wave form chart of one frame of this infrared signal is shown in drawing 7 . The signal is discriminated by whether the signal of each bit is in high level H by one frame consisting of 16 bits in 17ms, or it is in low REPERU L. The triplet of the beginning of one frame is start bit **, and it is LLH. The start of a frame is shown.

[0044] The following 2 bits are directional-control bit **, and in LL, the left and HL show the right and they shows rectilinear propagation by HH at a stop and LH. The

following 2 bits are speed-control bit **, and in LL, a stop and LH show acceleration and they shows a run by Slowdown HH by HL at top speed.

[0045] The drive of the oscillation coil 66 which the following 1 bit is position sensing-coil control-bit **, and was prepared in the bottom of each aforementioned carrier is directed, L shows a coil flow and H shows coil un-flowing.

[0046] It is what carries out the selection directions of a control signal about which carrier the following triplet is carrier subdevice-bit **, and the signal of the frame concerned is among six sets of carriers 50. LLL It is LLH for all carriers. The 1st set and LHL The 2nd set and LHH The 3rd set and HLL The 4th set and HLH The 5th set and HHL Being aimed at the 6th set is shown and it is HHH. It is a reserve.

[0047] Carrier control of further many in filling the number of bits of this carrier subdevice-bit ** is possible. The following 4 bits are parity check bit **, and directs a checksum. The following 1 bit is end bit **, and shows the end of a frame by H.

[0048] The PUROKKU view of the carrier 50 side control system which receives the above infrared radiation is shown in drawing 8 . On each carrier 50, the aforementioned current collection unit 70 receives supply of power, and it is a power circuit 120. It is changed into suitable voltage and is an one-chip microcomputer 104. An electric power supply is carried out to other equipments.

[0049] The infrared signal received by the electric eye 57 is an one-chip microcomputer 104 as a digital serial signal of H and L from an electric eye 57. It inputs and decodes. One-chip microcomputer 104 It is based on the place which each control-bit **, **, and ** direct when it is judged as its carrier control signal as a result of decode of carrier subdevice-bit **, and they are the run control-motor circuit 121 and the directional-control motor circuit 122 about each control signal. The centering detector 123 and oscillator circuit 124 It outputs. Run control-motor circuit 121 Drive control of the motor 54 for a run is carried out, and it is the directional-control motor circuit 122. Drive control of the motor 55 for steering is carried out, and it is an oscillator circuit 124. Drive control of the oscillation coil 66 is carried out.

[0050] Centering detector 123 Centering detection photo interrupter 125 Drive control is carried out. This centering detection photo interrupter 125 Distinction of whether a carrier 50 is in a rectilinear-propagation state by drive is attained, and when directional-control bit ** of the aforementioned infrared signal is HH The motor 55 for steering, and centering detection photo interrupter 125 When it drives and a front wheel 51 goes in the rectilinear-propagation direction, it is the centering detection photo interrupter 125. You tell having centered, the motor 55 for steering makes it drive, and it considers as a rectilinear-propagation run.

[0051] Next, the position method of detection of a carrier 50 is explained based on drawing 9 or drawing 14 . the position detection board 41 and the position detection unit 103 which drawing 9 is a block diagram because of position detection, and were stretched under the carrier 50 from -- it becomes Although the position detection board 41 is carrying out the rectangle, the annular run way is formed in this upper part like the dashed line.

[0052] This position detection board 41 is an electric wire 130 in all directions. It was spread around, and if X shaft orientations and Y shaft orientations are decided to be drawing 9 as an arrow shows, two or more electric wires to which it pointed in Y shaft orientations are enumerated [X shaft orientations], two or more electric wires to which it

pointed in X shaft orientations are enumerated [Y shaft orientations], and both are insulated.

[0053] The edge of the electric wire to which it pointed in Y shaft orientations is the X-axis position detector 131. The edge of the electric wire to which connected and it pointed in X shaft orientations is the Y-axis position reference circuit 132. Connecting, the detecting signal from the reference circuit of each axis of coordinates is the position detector 133. It is inputted, the carrier position on the position detection board 41 is determined, and it is a microcomputer 101. The result is outputted.

[0054] X-axis position detector 131 The direction which detects the position of the carrier 50 of X shaft orientations to depend is explained based on drawing 10 and drawing 11 . In addition, the same is said of position detection of Y shaft orientations. Electric wire 130 to which it pointed in Y shaft orientations A sign is attached with x0, x1, x2, and sequentially from the left.

[0055] It connects with one collectively through a switch SW 134, respectively, and each electric wire x0, x1, x2, and the edge of are a comparator circuit 135. It is inputted and each switch SW 134 is the switching drive circuit 136. Drive control is carried out.

Switching drive circuit 136 An address signal is received and it is a switch SW134. Order is made to carry out an on-off drive from the switch SW concerning an electric wire x0.

[0056] Namely, electric wire x0 The following electric wire x1 after the switch SW to apply was turned off by the ON following ** It is turned off after the switch SW to apply is turned on, and it is the following electric wire x2. An on-off drive is made one by one as the switch SW to apply is turned on and off. therefore, comparator circuit 135 **** -- the current which flows on each electric wire and which will come out and exist -- electric wire x0 It will flow sequentially from current.

[0057] A certain carrier 50 is an electric wire x1 now. As the oscillation coil 66 of this carrier 50 shows drawing 10 when it is upwards namely, it is an electric wire x1. When having started upwards and this oscillation coil 66 oscillates, it is an electric wire x1. Induced electromotive force occurs and it is an electric wire x1. Current flows and it is an electric wire x1. While the switch to apply turns on comparator circuit 135 This current is inputted. In addition, electric wire x1 The nearby electric wire x0 and x2 Since there is intersection of some magnetic flux, slight current flows.

[0058] The wave form chart is shown in drawing 11 . electric wire x1 the current which appears notably -- electric wire x1 Switch SW134 to apply ON time -- comparator circuit 135 an input signal x -- as it is -- appearing -- the addresses 0 and 2 of others [time zone / of the address 1], and the time zone of 3 -- comparing -- projection -- a wave is seen the bottom It is a comparator circuit 135 about this input signal x. If it changes into a pulse signal as compared with a reference current value, pulse shape will be looked at by only the address 1 like an output signal x.

[0059] Thus, the position of a carrier 50 is an electric wire x1. It is detected that it is upwards and the carrier position of X shaft orientations is detected. It is the Y-axis position reference circuit 132 similarly. The position of Y shaft orientations is detected and the two-dimensional position of a carrier 50 can be determined with XY coordinate above.

[0060] Thus, the signal which detected the position of a carrier 50 is inputted into a microcomputer 101, and drive control of a carrier 50 is presented with it. in addition, the oscillation coil 66 of each carrier 50 directs an oscillation by L signal of position sensing-

coil control-bit ** of the control signal by the aforementioned infrared radiation -- having -- 70ms -- a time oscillation drive is carried out

[0061] The drive timing of the oscillation coil 66 of each carrier 50 is explained based on drawing 12 . This drawing 12 is the infrared generator 102. It is the timing chart which shows the drive state of the oscillation coil 66 of a control signal and each carrier 50 by infrared radiation. In addition, it is a1, a2, a3, a4, a5, and a6 in six sets of carriers 50, respectively. A number will be ** (ed).

[0062] At the frame of the beginning of a control signal, it is all carrier a1 -a6 first. An instruction of centering is directed and each carrier will be in a rectilinear-propagation state. And it is a carrier a1 at the following frame. A control signal is oscillated and it is a carrier a1. It is this carrier a1 at the same time an operation instruction is directed. An oscillation instruction is made by the oscillation coil 66.

[0063] At the following frame, it is a carrier a2. Although an operation instruction is directed, there is no oscillation instruction of an oscillation coil 66. Carrier a1 by the aforementioned oscillation instruction when this frame begins The oscillation of an oscillation coil 66 begins, and an oscillation is maintained until 70ms of fixed time passes unenthusiastically. Like the above-mentioned, it carries out and is a carrier a1 first in the meantime. An X coordinate is detected and, subsequently a Y coordinate is detected.

[0064] It is fed back and, next, this detection result is a carrier a1. It is reflected in the operation instruction of the frame to control, and feedback control is made. Carrier a2 It is a carrier a3 and a4 one by one after the frame of an operation instruction. An operation instruction is made with -- and it is a carrier a6. The oscillation instruction of an oscillation coil 66 is made.

[0065] Simultaneously with the start of the following frame, this oscillation instruction is a carrier a6. An oscillation coil 66 is made to drive for 70ms henceforth. thus, five frames -- 1 time -- comparatively -- one by one -- a carrier a1, a6, and a5 the oscillation instruction of the oscillation coil 66 of -- should do -- the position of a carrier is detected one by one

[0066] Drawing 13 showed this control procedure with the flow chart. Each frame is shown for every step and it is a carrier a6 at Step 31. It is a carrier a1, a2, a3, a4, a5, and a6, returning to Step 2 and repeating from Step 2 to the step 31 henceforth, after there is an operation instruction. Feedback control is made.

[0067] Next, the control routine of the detection procedure of position detection is illustrated and explained to drawing 14 . When power was switched on (Step 40), after initial setting was made first (Step 41), carrier a1 ***** -- electric wire x0 from -- a sequential retrieval should do (Step 42) -- if an X coordinate is detected (Step 43) -- a degree -- electric wire y0 from -- a sequential retrieval should do (Step 44) -- the place where the Y coordinate was detected -- (Step 46) and carrier a1 The position on the position detection board 41 is determined (Step 46).

[0068] and the following step 47 -- all carrier a1 -a6 ***** -- when it is judged whether position detection was made and no position detection of carriers is made, it returns to Step 42 and a position is detected about the following carrier thus, once -- all carrier a1 -a6 ***** -- after position detection is made, it is made to perform reference from the near position of the detected X coordinate and a Y coordinate, and is made to gather reference speed from next time

[0069] namely, the step 48 -- setting -- first -- carrier a1 ***** -- if the electric wire

of the X coordinate detected previously is set to x_i , an X coordinate will be searched from electric wire x_{i-k} of ***** $i-k$ younger than i . Moreover, depending on the case, it may search toward the electric wire of young ***** from large ***** $i+k$.

[0070] and the time when it jumped over Steps 50 and 51 and progressed to Step 52 when it has distinguished and (Step 49) detected whether the X coordinate was detectable, and it has not detected -- again -- electric wire x_0 from -- it searches and an X coordinate is detected (Step 51) Usually, since it is detectable in ***** if reference is performed from electric wire x_{i+k} , retrieval time can be shortened sharply.

[0071] if it distinguishes and (Step 53) searches similarly whether reference was performed from electric wire y_{i+k} (Step 52), and it has searched about a Y coordinate and cannot fly and detect to Step 56 -- electric wire y_0 from -- it searches (Step 54) and a Y coordinate is detected (Step 55) Thus, position detection of the carrier after the 2nd times is performed, and reference speed is gathered.

[0072] The above is the macro computer 101, although related with drive control of a carrier 50. In addition to this, control of a satellite 4 and a display 12 is also performed, and the block diagram of the control system is illustrated to drawing 15 and drawing 16, and is explained briefly.

[0073] drawing 15 -- the control-system block diagram of a satellite 4 -- it is -- the control signal from a microcomputer 101 -- terminal control circuit 140 it inputs -- having -- this terminal control circuit 140 The medal input means 141 and medal expenditure means 142 it controls -- having -- image-processing means 143 **** -- while a processing instruction is outputted -- the medal input means 141 and medal expenditure means 142 from -- a detecting signal -- terminal control circuit 140 minding -- microcomputer 101 It is outputted.

[0074] Medal input means 141 An injection of the medal from the aforementioned coin slot 7 is detected, and the number of the thrown-in medals etc. is computed. When a vote horse wins a prize, the medal paid a dividend pays out the medal expenditure means 12. In addition, dividend calculation etc. is a microcomputer 101. It carries out.

[0075] image-processing means 143 the aforementioned monitor's 5 image processing is performed -- it is Next, drawing 16 is the control-system block diagram of a display 12, and is a microcomputer 101. It is the lamp display control circuit 144 by directions of a shell. Lamp display 145 Drive control is carried out and it is the 7seg. display control circuit 146. Buffer circuit 147 It minds and is the 7seg(s). display control circuit 148. Drive control is carried out and it is introduction of a horse. Number A framework etc. is displayed.

[0076] Next, the control procedure of the whole horse race game equipment 1 concerning this example is explained based on the flow chart of drawing 17. if power is switched on first (Step 60), initial setting should do (Step 61) -- the first demonstration is started (Step 62) A lighting system 11 is turned on, the display of a display 12 is made, and, as for this demonstration, the announcement of a fanfare, introduction of a horse, etc. is performed from a loudspeaker 10.

[0077] And when the demonstration to medal injection detection of the following step 63 is performed and there is an injection of a medal, it is a microcomputer 101 first. It opts for race expansion (Step 64).

[0078] The determination of race expansion is chosen at random [from / one] among race expansions (the computer memorizes) of a large number prepared beforehand, a race

advances according to the race expansion for which it opted here, and run control of each carrier 50 is carried out based on this race expansion.

[0079] And a screen display of the race information is carried out to the monitor 5 of each satellite 4 at Step 65, and a play person looks at this information, determines a vote horse, and operates and votes a control panel 6. After vote finishes, a race is developed until a race begins (Step 67) and a race finishes (Step 68).

[0080] Run control of each carrier is carried out based on the control signal by infrared radiation, this carrier 50 is followed, and the model horse 20 competes on a truck 3. And after a race is completed (Step 68), a dividend is calculated according to the order which made a goal (Step 69). A screen display of the order of arrival and the dividend is carried out to a monitor 5 (Step 70), it is judged whether subsequently each play person won (Step 71), when it wins, expenditure of a medal is made according to a dividend (Step 72), and when it loses, it jumps over Step 72 and progresses to Step 73.

[0081] At Step 73, when it is judged whether the credit remains or not and it remains, it returns to Step 64, and opts for new race expansion, vote is made again, and a race begins. When the credit does not remain at Step 73, it returns to Step 62, a demonstration is performed again, and an injection of a medal is needed.

[0082] Next, run control of a carrier is illustrated to drawing 18, and a flow chart is explained. When power is switched on (Step 80) and initial setting is carried out (Step 81), it is carrier a1 -a6. In order to make travelling direction rectilinear propagation first, centering is performed and it controls in the center valve position (Step 82).

[0083] And in order to detect the position of each carrier 50 before a start, the oscillation coil 66 of each carrier 50 is oscillated one by one (Step 83), and the position detection board 41 is minded, and it is the position detection unit 103. The position of each carrier is detected (Step 84).

[0084] And the distance to the start point of each carrier 50 is calculated by waiting for the start of a demonstration (Step 85) (Step 86), and each carrier 50 is moved to a start point (Step 87). It judges whether all the carriers were equal to the start point (Step 88), and repeat Steps 86, 87, and 88, a carrier is made equal to a start point, and the model horse 20 is arranged in a starting line until it gathers.

[0085] The determination of race expansion is waited for the start of waiting (Step 89) and a race in the place which had complete set of carriers of all (Step 90). When a race starts, the race expansion for which it opted is followed and they are each carriers a1-a6. Run control is carried out (Step 91) and it is carrier a1 -a6 by the position detection board 41 serially. A position is detected (Step 92). And if it judges whether it is the end of a race (Step 93) and the race is not completed, it judges whether the race expansion set up beforehand is compared with the position of each detected carrier, and it is going on to race expansion ***** (Step 94).

[0086] if it is race expansion ***** , he returns to Step 91 and run control of a carrier should old-*****-do -- if it is not race expansion ***** , the difference of the future position by the race expansion for which advanced to Step 95 and it opted beforehand, and the position of an actual carrier will be computed (Step 95), a run of each carrier is controlled based on this calculation result (Step 96), and it returns to Step 94

[0087] Thus, if Steps 91, 92, 93, and 94 are repeated and it separates from race expansion while the race is advancing to race expansion ***** determined beforehand, Steps 95 and 96 will make it run each carrier in the position repeated and expected, and will

correct it to it. And when it moves from Step 93 that a race is completed to Step 97, the remaining existence of a credit is judged (Step 97) and the credit remains, it returns to Step 86, and when the credit does not remain, it returns to Step 85 further.

[0088] The horse race game equipment of this operation can copy signs that it runs each model horse 20 lengthening by securing the most advantageous possible position and hanging since it runs according to the carrier with which drive control of each model horse 20 is carried out independently as mentioned above without being regulated by the course like an actual horse race, and can make a race very interesting. Since the feedback control by position detection is made, the drive of each carrier can realize race expansion for which it opted beforehand certainly.

[0089] Since it is selected at random out of race expansion of the varieties memorized beforehand, separate race expansion is made for every race, and unlike what anticipation attaches simply, interest maintains race expansion. In addition, although it was made time sharing in this example and position detection of a carrier was performed, if this frequency is discriminated by making into frequency different, respectively frequency which the oscillation coil of each carrier oscillates and it enables it to detect, the position of a suitable carrier is detectable if needed at any time.

[0090] Moreover, the example which performs position detection using a counter is shown below. the outline block diagram in which drawing 19 shows the position detection mechanism of this example -- it is -- position detection board 150 a top -- carrier 151 running -- each carrier 151 **** -- coil 152 for position detection Luminescence equipment 153 which changes a detecting signal into a lightwave signal and is transmitted while being carried It has.

[0091] Main part 154 of a game machine In a side, it is light-receiving equipment 155. It is arranged (it arranges in the periphery predetermined position of the aforementioned run way), and is this light-receiving equipment 155. Counter 156 which calculates the number of input signals It has and is this counter 156. Counted value is a microcomputer 157. It is inputted.

[0092] It sets in the above position detection mechanisms, and is the position detection board 150. The electric wire x0 to which the electric wire is laid in the shape of a grid as shown in drawing 20 , and it pointed in Y shaft orientations, x1, and x2 In --, it is frequency f1. The electric wire y0 to which current was energized and it pointed in X shaft orientations, y1, and y2 The current of frequency f2 ($\neq f1$) is energized by --. In addition, the aforementioned main part 154 of a game machine Near light-receiving equipment 155 and counter 156 When a detail is explained based on drawing 21 , it is changed into an electrical signal and the light which received by electric-eye 155a is the amplification machine 158. It is amplified and is frequency f1. f1 which passes only a signal Filter 159 And frequency f2 f2 which passes only a signal Filter 160 It is inputted.

[0093] f1 Filter 159 The passed signal is inputted into X counter 156a, and it is f2. Filter 160 The passed signal is inputted into Y counter 156b. The count signal of both counter 156a and 156b is a microcomputer 157. It is inputted. Therefore, carrier 151 Position detection board 150 When it runs a top, it is the coil 152 for position detection. An electric wire x0 and x1 --, y0, and y1 Whenever it will move in the inside of the magnetic field formed of the current which flows -- and exceeds one electric wire [one], it is the coil 152 for position detection. Induced electromotive force arises.

[0094] Frequency f1 high to this induced electromotive force f2 The thing is contained,

and it responds to change of this induced electromotive force, and is luminescence equipment 153. It operates and a lightwave signal is sent. The aforementioned light-receiving machine 155a receives this signal, and it is frequency f1. If it attaches, the travel of the direction of X can be known at X counter 156a counting, and it is frequency f2. If it attaches, the travel of the direction of Y is detectable at Y counter 156b counting.

[0095] The control procedure of this position detection is explained based on the flow chart of drawing 22. this flow chart -- setting -- Step 102 from -- Step 107 ***** -- the step which detects the position of the beginning of a carrier 151 -- it is -- Step 108 from -- Step 110 ***** -- subsequent carrier 151 It is the step which detects a position.

[0096] When power is switched on first (Step 100), initial setting is made (Step 101) and, subsequently it is an electric wire x0. It energizes (Step 102) and is a carrier 151. It judges whether electromagnetic field were received (Step 103). It is an electric wire x0. It is a carrier 151 upwards. If it is, it will be the coil 152 for position detection. Induced electromotive force is produced and it is a carrier 151. Although it means receiving electromagnetic field, it is an electric wire x0. It is a carrier 151 upwards. It is a carrier 151 when there is nothing. Electromagnetic field are not received.

[0097] Coil 152 for position detection Carrier 151 to twist The receiving state of electromagnetic field is a carrier 151 serially. Light-receiving equipment 155 Since it is transmitted, a receiving state is the main part 154 of a game machine. It is grasped by the side. Electric wire x0 It is a carrier 151 by energization. It is Step 102 when electromagnetic field are not received. It returns and is the following electric wire x1. It energizes and the existence of reception of electromagnetic field is seen (Step 103).

[0098] This step 102 and 103 It is a carrier 151 repeatedly. It is a carrier 151 in the position of the electric wire energized at this time in the place which received electromagnetic field. An X coordinate can be detected and it is Step 104. It goes on. It is an electric wire y0 shortly. Shell sequential energization is carried out and it is a carrier 151. The existence of reception of electromagnetic field is judged (Step 105), and it is a carrier 151. A Y coordinate is detected. And it is a carrier 151 from the above X and a Y coordinate. A position is determined (Step 106) and they are all the carriers 151. It is Step 102, if it judges whether position detection was completed (Step 107) and has not ended. It returns and they are the remaining carriers 151. Position detection is performed.

[0099] Step 102 from -- Step 107 up to -- the position of the beginning of all the carriers 151 is determined by repeating -- having -- this initial valve position -- counter 156 It is set up as a current value. And the following step 108 It energizes on all electric wires then, and is a carrier 151. In connection with a run, whenever it energizes each electric wire of the direction of X, and the direction of Y, it is a carrier 151. X counter 156a and Y counter 156b count the number of the electromagnetic fields which receive, respectively (Step 109). It is a carrier 151 by the counted value of this X counter 156a and Y counter 156b. A move position is determined (Step 110). Step 108, 109, and 110 It is a carrier 151 by repeating. A move position can be determined serially.

[0100] At the above example, it is a counter 156. Main part 154 of a game machine Although prepared in the side, it is each carrier 151. A counter is carried and you may make it transmit the counted value of a counter to the main part side of a game machine. Moreover, an electric wire x0, x1, and x2 In --, it is frequency f1. Current, an electric wire y0, y1, and y2 Frequency f2 which is different in -- Although current was energized, position detection is possible, even if it carries out time sharing of the current of the same

frequency and energizes this.

[0101] That is, it is the electric eye 160 by the side of the main part of a game machine so that it may illustrate to drawing 23 . The received position detecting signal is amplifier 161. It is amplified and is a switching circuit 162. It minds and they are the X counter 163 and the Y counter 164. Time sharing is carried out to each, it is made to be inputted into it, and they are this X counter 163 and the Y counter 164. Counted value is a microcomputer 165. It is inputted. It is a switching circuit 162 here. A contact is switched and it is amplifier 161. An outgoing end, the X counter 163, and Y counter 164 Each input edge is connected by turns.

[0102] The electric wire x0 of a now position detection board, x1, and x2 Time to energize to --, and y1 and y2 The relation of time to energize to -- is illustrated to drawing 24 . [an electric wire y0, and] When it is in the high level of a signal, it is shown that energization is performed, the resistance welding time and the non-resistance welding time are Time t equally, and an electric wire y0, y1, and -- are energized by turns with an electric wire x0, x1, and --.

[0103] It is a switching circuit 162 in every time t of this. When it is made to switch a switch, and energized by an electric wire x0, x1, and --, it is the X counter 163. It operates, an electric wire y0, y1, and -- can operate, and the move position of a carrier can be detected by time sharing. In addition, since Time t is short time compared with time to move between the electric wires with which a carrier adjoins each other, while detecting an X coordinate, the fault that position detection of Y shaft orientations was not made does not have it.

[0104] Various how to carry out position detection of the carrier as mentioned above is considered. Moreover, in the above example, although the example applied to the game equipment imitating the horse race race was shown, otherwise, it is applicable to games, such as competition by the car race and human being.

[0105]

[Effect of the Invention] Since this invention can develop a race, without each model object's being able to run freely and being regulated by the course like an actual race, it can experience excitement peculiar to a race and can make the race itself interesting. Since the race expansion set up for every race was not decided, anticipation of the order of arrival is difficult and each play person always gets a fair game.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the outline block diagram of the control system of the horse race game equipment concerning the gestalt of 1 operation of this invention.

[Drawing 2] It is this whole horse race game equipment external view.

[Drawing 3] It is the cross section showing the drive of the carrier in this operation gestalt, and a model horse.

[Drawing 4] It is the perspective diagram showing the drive of this carrier.

[Drawing 5] It is the outline block diagram of the control system of this operation gestalt.

[Drawing 6] It is the plan showing arrangement of an infrared photogenic organ run on the street.

[Drawing 7] It is the wave form chart of one frame of an infrared signal.

[Drawing 8] It is a control-system block diagram by the side of a carrier.

[Drawing 9] It is a block diagram for position detection of a carrier.

[Drawing 10] It is explanatory drawing explaining the position method of detection.

[Drawing 11] It is a wave form chart for explaining the position method of detection.

[Drawing 12] It is the timing chart which shows the drive state of an infrared control signal and an oscillation coil.

[Drawing 13] It is the flow chart which shows a drive control procedure.

[Drawing 14] It is the flow chart which shows a position detection means.

[Drawing 15] It is the control-system block diagram of a satellite.

[Drawing 16] It is the control-system block diagram of a display.

[Drawing 17] It is the flow chart which shows the control procedure of this whole equipment.

[Drawing 18] It is the flow chart of run control of a carrier.

[Drawing 19] It is the outline block diagram showing the position detection mechanism in another example.

[Drawing 20] It is explanatory drawing showing the wiring state of the electric wire of the position detection board in this example.

[Drawing 21] It is the block diagram of the position detection mechanism by the side of the main part of a game machine of this example.

[Drawing 22] It is the flow chart which shows the position detection procedure of this example.

[Drawing 23] It is the block diagram of another example showing another position detection mechanism.

[Drawing 24] It is the timing chart which shows the energization state to the electric wire in this example.

[Description of Notations]

1 [-- A truck, 4 / -- A satellite, 5 / -- Monitor,] -- Horse race game equipment, 2 -- A pedestal, 3 6 [-- A coin expenditure mouth 9 / -- Arm material,] -- A control panel, 7 -- A coin slot, 8 10 [-- A display, 20 / -- Model horse,] -- A loudspeaker, 11 -- A lighting system, 12 20a -- forefoot and 20b -- [-- A support, 23 / -- Truck,] Hind legs, 21 -- A rider, 22 24 [-- Supporter material, 27 / -- A magnet, 30 / -- Design field,] -- A front wheel, 25 -- A rear wheel, 26 31 [-- A run way, 41 / -- A position detection board, 42 / -- Acrylic,] -- A back up plate, 32 -- An electric supply board, 40 50 [-- A rear wheel, 53 / -- A base, 54 / -- The motor for a run,] -- A carrier, 51 -- A front wheel, 52 55 [-- Electric eye,] -- The motor for steering, 56 -- A motor drive substrate, 57 58 [A substrate, 60, 61 -- A board member, 62 -- Compression spring,] -- A VCO substrate, 59 -- CPU 63 64 [-- An oscillation coil, 70 / -- Current collection unit,] -- A roller, 65 -- A magnet, 66 71 [-- A wheel, 91 / -- Bearing bracket,] -- A current collector, 72 -- A spring, 90 92 [-- An arm, 95 / -- Supporter material,] -- A driving shaft, 93 -- A gearbox, 94 96 -- A tie rod and 96a -- [-- Pinion,] A rack, 97 -- A driving shaft, 98 100 The main part of -- game machine, and 101 -- A microcomputer and 102 -- infrared luminescence equipment, 103 -- position detection unit and 104 -- one-chip microcomputer, 110 -- infrared photogenic organ, 111, 112 -- A mirror and 120 -- Power circuit, 121 -- run control-motor circuit and 122 -- directional-control motor circuit and 123 -- Centering detector, 124 -- oscillator circuit and 125 -- Centering detection photo interrupter, 130 -- electric wire and 131 -- An X-axis position reference circuit and 132 -- Y-axis position

reference circuit, 133 -- position detector and 134 The -- switch SW and 135 -- Comparator circuit, 136 -- switching drive circuit and 140 -- A terminal control circuit, 141 -- Medal input means, 142 -- medal expenditure means, 143 -- An image-processing means and 144 -- Lamp display control circuit, 145 -- lamp display and 146 -- 7seg. display control circuit, 147 -- buffer circuit and 148 -- A 7seg. display and 150 -- Position detection board, 151 -- carrier and 152 -- The coil for position detection, and 153 -- luminescence equipment, 154 The main part of -- game machine, and 155 -- Light-receiving equipment, 155a -- Electric eye, 156 -- A counter, a 156 a--X counter, a 156 b--Y counter, 157 -- microcomputer and 158 -- amplifier and 159 -- f1 A filter and 160 -- f2 A filter and 161 -- electric eye and 162 -- amplifier and 163 -- switching circuit and 164 - X counter and 165 -- Y counter and 166 -- microcomputer.